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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
KATSUMI YABUSAKI	: EXAMINER: MAIER, L.
SERIAL NO: 10/576,468	:
FILED: APRIL 20, 2006	: GROUP ART UNIT: 1623
FOR: CELLULOSE II PHOSPHATE ESTER AND METAL-ADSORBING MATERIAL USING THE SAME	:

DECLARATION UNDER 37 C.F.R. § 1.132

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

I, Katsumi Yabusaki, declare and state as follows:

1. I am a graduate of Tsukuba University and received a Ph.D. degree in 2001, and have been employed by KOWA COMPANY, LTD., for 17 years as a researcher in the field of applied sciences and technologies and I understand the English language or, at least, that the contents of the Declaration were made clear to me prior to executing the same.

2. I am familiar with the claims, and have read the Office Action mailed January 12, 2009, in the above-identified application.

3. The following experiments were conducted under my supervision and/or control:

A. Raw material

1) Cellulose II

Cellulose II was synthesized based on the Production Example (1) of the specification of the above-identified application, using a-cellulose powder as a raw material.

i) A raw material dried at 70°C for 6 hours (A)

ii) Cellulose II having various water contents[1] (B)

2) A phosphorylating chemical solution was prepared by mixing 0.015mol of phosphoric acid, 0.020mol of diammonium hydrogenphosphate, 0.1mol of urea and 1.5mL of water.

B. Synthesis method

To 1 g of each of cellulose II (dried cellulose II (A): the above-mentioned raw material) and cellulose II (B) having various water contents, the above-mentioned phosphorylating chemical solution was added, and thus-prepared mixture was dried at 90°C for 4 hours, followed by a burning at 150°C for 2 hours. Subsequently, the reaction product was washed with water and dried(70℃), and thus the carbamidated cellulose II phosphate was obtained.

C. Result

The zinc-adsorbing capacity of the thus-obtained carbamidated cellulose II phosphate was measured. The measurement results of the amounts of the metal (zinc) adsorbed at the 24th hour that an adsorption equilibrium had been already reached are shown in Fig. 1 **attached herewith**. Thus, it was indicated that the

[1] The weight of water included in cellulose II when cellulose II prepared by the Production Example (1) was wringed slightly was 5.4 g per gram of cellulose II. This value was regarded to correspond to water content of 100%. Thus, the water content of each of cellulose II was calculated.

higher water content of cellulose II used as raw material resulted in the lower zinc-adsorbing capacity of the carbamidated cellulose II phosphate.

D. Discussion

The reason that the higher water content of cellulose II used as raw material resulted in the lower metal-adsorbing capacity of the carbamidated cellulose II phosphate is given as follows.

1) Cellulose II has a high hydrophilicity. Therefore, a lot of amounts of water moves to a reaction system unless cellulose II is dried.
2) An esterification reaction between alcohol group of cellulose and phosphoric acid is related to a dehydration condensation reaction. When a lot of amounts of water exist in a system, the reaction returns to de-esterification reaction, resulting in the decrease in the phosphoric acid to be introduced.
3) Using raw material (cellulose II) including a lot of amounts of water, only the surface of cellulose II was dried and hardened during heating and drying, and then, water contained inside cellulose II is difficult to be vaporized and dried sufficiently. Sufficient drying effect can not be exhibited.
4) A phosphorylating chemical solution can not readily penetrate inside of cellulose II since cellulose II in which water is contained is in a form of gel. However, if cellulose II is dried, the phosphorylating chemical solution can readily penetrate the cellulose II. In water-containing cellulose II, liquid phases outside and inside of gel can not easily be replaced with each other.

E. Other comment

In view of a possibility that complete drying may not be carried out in a strict sense even if cellulose II material (A) is dried at 70°C for 6 hours, 1.000 g of cellulose II obtained by carrying out the above-mentioned dry process was further dried at 105°C for 2 hours, and the thus-obtained cellulose II was weighed. The weight of the cellulose II was 0.957 g and water of 0.043g was contained therein. Subsequently, according to the above-mentioned calculation (see column of raw material), it was found that water content thereof corresponded to about 1.6 %.

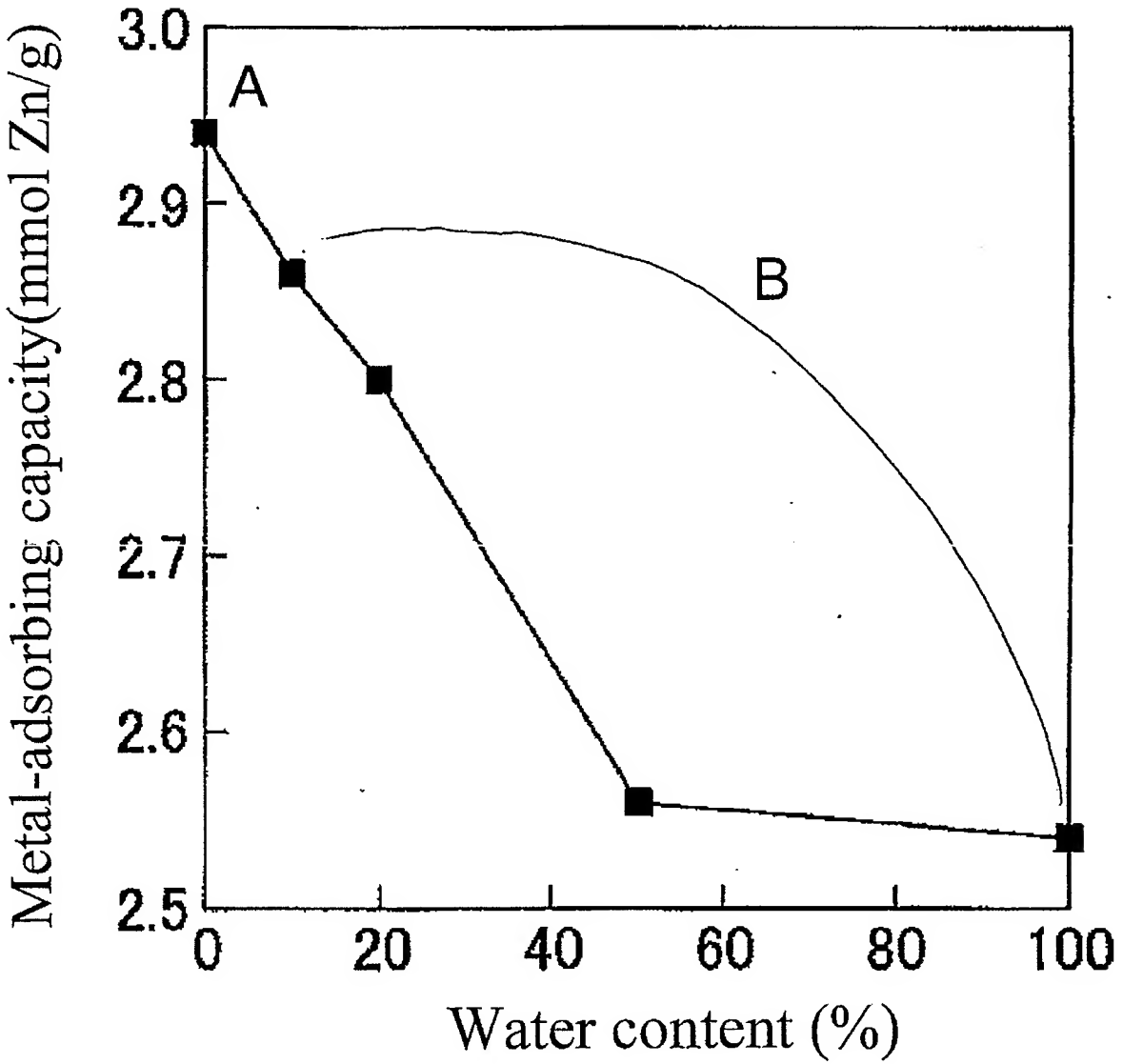
4. The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

5. Further declarant saith not.

Katsumi Yabusaki
Signature

April 27, 2009
Date

Fig. 1


Metal-adsorbing capacity(mmol Zn/g)
3.0
2.9
2.8
2.7
2.6
2.5
A
B
0
20
40
60
80
100
Water content (%)